Inclusion

Impact and Individualization of Peer Support Arrangements for High School Students with Autism Using Structural Analysis

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Abstract:	Including students with autism spectrum disorder (ASD) well in high school general education classrooms requires intentional and individualized support. We examined the efficacy and social validity of peer support arrangements for enhancing the social and academic outcomes of three students with ASD, two of whom also had an intellectual disability (ID). We also explored the use of structural analysis to further individualize these interventions. Peer support arrangements increased social interactions and academic engagement for all three students. Structural analysis results were used to further refine each peer support arrangement. Our findings strengthen support for peer support arrangements as a research-based approach to promote the general education classroom inclusion of high school students with ASD. It also highlights the value of incorporating additional assessment to individualize these interventions for students with ASD with and without ID.

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Abstract

Including students with autism spectrum disorder (ASD) well in high school general education classrooms requires intentional and individualized support. We examined the efficacy and social validity of peer support arrangements for enhancing the social and academic outcomes of three students with ASD, two of whom also had an intellectual disability (ID). We also explored the use of structural analysis to further individualize these interventions. Peer support arrangements increased social interactions and academic engagement for all three students. Structural analysis results were used to further refine each peer support arrangement. Our findings strengthen support for peer support arrangements as a research-based approach to promote the general education classroom inclusion of high school students with ASD. It also highlights the value of incorporating additional assessment to individualize these interventions for students with ASD with and without ID.

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Ensuring students with autism spectrum disorder (ASD) and intellectual disability (ID) have well-supported opportunities to participate meaningfully within inclusive classrooms has been a longstanding focus of legislation, policy, advocacy, and research (Morningstar et al., 2016). Although enrollment in general education classes remains limited for many students with disabilities, students with ASD and/or ID have experienced noticeable increases in regular class participation over the last 15 years (Morningstar et al., 2017). According to the U.S. Department of Education (2019), 39.8% of secondary students (ages 12-21) with ASD spend 80% or more of their school in regular classes, 18.3% spend between 40-79% of their school day in regular classes, and 33.5% spend less than 40% of their school day in regular classes; the remainder attend separate schools or receive educational services elsewhere. For students with ID, 16.6% of secondary students spend 80% or more of their school in regular classes, 27.9% spend between 40-79% of their school day in regular classes, and 48.74% spend less than 40% of their school day in regular classes. However, mere presence within general education classrooms does not guarantee that students with disabilities will benefit from the myriad social and learning opportunities available in inclusive settings (Feldman et al., 2016; Kurth & Mastergeorge, 2012). Social interactions with peers can be difficult and elusive for many of these students, particularly during adolescence (Carter et al., 2014). Moreover, the curriculum becomes increasingly challenging as students progress through secondary school.

Peer support interventions are an evidence-based peer-mediated approach that can address some of the social and academic challenges students with ASD—especially students who have a co-occurring ID—experience within general education classes. Peer support arrangements involve identifying one or more peers who receive guidance from a paraprofessional or special

educator to provide ongoing academic, social, and behavioral support to a classmate with a disability (Carter et al., 2011). A recent review by Brock and Huber (2017) identified peer support arrangements as an evidence-based practice for increasing social interactions in middle and high school classrooms for students with severe disabilities (i.e., students with significant cognitive impairments). The review included 11 studies which met minimum standards for special education research set by the Council for Exceptional Children (CEC, 2014). Among the 9 studies using single-case research designs, only 7 of 34 participants with severe disabilities also had ASD, but all showed improved social outcomes contingent on the introduction of peer support interventions. In the one randomized control trial comparing the effects of peer support arrangements to an exclusive reliance on direct adult support (i.e., business as usual), 22 of 50 students with severe disabilities also had ASD (Carter et al., 2016). Students with severe disabilities who participated in peer support arrangements engaged in significantly higher rates of social interactions with peers without disabilities, as compared to those in the business-as-usual comparison group. Post hoc analyses found no significant differences in effects for students who also had ASD. Despite ample support for the efficacy of peer support arrangements for students with severe disabilities, further examination of the effectiveness and feasibility of peer support arrangements for high school students with ASD is critical.

Peer support arrangements allow some flexibility to address individual student and classroom characteristics. Although individuals with ASD share common social deficits, their support needs vary widely, making identifying specific needs and individualizing social interventions crucial to maximize student outcomes. Moreover, some students with ASD also have ID, while others do not. Differences across their classrooms, such as academic content, behavioral expectations, and classroom activities, further necessitate tailoring social interventions. Research on data-based decision-making (DBI)—a widely-accepted, best practice

in special education—indicates intervention adaptations based on objective, formative assessment are more likely to be effective in targeting the unique needs of students with ASD (National Autism Center, 2009) and students with ID (Browder et al., 2014). However, research examining formative assessment methods to identify and address individual differences within social interventions for students with ASD remains limited (Huber & Carter, 2016). In prior studies, individualization of peer support plans relied primarily on observations by classroom teachers or researchers serving as interventionists (e.g., Carter et al. 2015) and/or a review of participants' individualized education program (IEP) goals (e.g., Biggs et al., 2017; Brock et al., 2016; Carter et al., 2007). Although these interventions were still effective at improving social outcomes, it is unclear whether the information collected through observations and IEP reviews actually enhanced intervention effectiveness.

To date, only one study has examined the use of data-based, formative assessment to individualize peer support arrangements for high school students with ASD and/or ID. Huber and colleagues (2018) compared the effects of individualized peer support arrangements based on anecdotal information to an adapted peer support arrangement tailored to each participant based on the results of structural analyses conducted in their classrooms. *Structural analysis* is the experimental analysis of external contextual variables (i.e., antecedents, setting events, or other environmental variables) that may increase or decrease the likelihood a behavior will occur (Stichter & Conroy, 2005), specifically focusing on the role of contextual variables that set the stage for or precede a specific behavior. Similar to functional analysis, structural analysis relies on alternating conditions. However, structural analysis requires that both antecedents and consequences are held constant as other contextual factors are systematically manipulated to evaluate their impact on a target behavior (Stichter & Conroy, 2005). Although it is most commonly used to guide the development of antecedent-based interventions (e.g., Peck et al.,

1997; Stichter et al., 2009), structural analysis has not been widely examined as means of tailoring an existing intervention to better meet the needs of a particular student. After first demonstrating the effectiveness of peer support arrangements, Huber et al. (2018) conducted structural analyses to test hypotheses about contextual variables (i.e., seating arrangements, paraprofessional proximity, number of peers present, task alignment, task choice, peer preference) thought to increase or decrease social behaviors within each peer support arrangement. After adapting the peer support arrangements based on structural analysis results, social interactions increased for one participant and variability in social interactions decreased for the other two, suggesting peer support arrangements can be further refined.

The structural analysis procedure is fitting for implementation in natural settings and can incorporate natural change agents, such as peer conversation partners and supporting adults (Stichter & Conroy, 2005). Formative assessment in the natural social context is particularly important for social interactions, which often vary by communicative partner and social setting. Furthermore, implementing structural analysis in the context of an existing peer support arrangement has added benefits. In many social settings, including general education classrooms, the list of possible antecedents, setting events, or environmental factors influencing a particular social behavior can be extensive. Unlike functional analysis, for which there is a standard set of conditions to test, a standard list of conditions does not exist for structural analysis. However, implementing structural analyses in the context of an existing peer support intervention reduces the list of potentially relevant contextual factors from those of the entire classroom to those most relevant to the peer support arrangement (Huber et al., 2018).

The current study extends prior research on peer support arrangements by (a) focusing only on high school students with ASD; (b) employing refined observational measures, including a more sensitive measure of interaction quality (i.e., content and affect) and observational

measures of peer academic support and adult facilitative behaviors; and (c) simplifying structural analyses to focus on only one contextual variable (i.e., two conditions). Specifically, we addressed the following research questions:

1. Are peer support arrangements effective at increasing the social interactions of students with ASD—as well as maintaining or improving academic engagement—relative to individually assigned special educator or paraprofessional supports?
2. Can structural analysis identify contextual variables that impact social interactions within general education classrooms?
3. How does the addition of structural analysis-based components to peer support arrangements impact social interactions?
4. How do participants view the intervention and structural analysis process?

Method

Participants and Settings

After receiving university Institutional Review Board and district research approval, we recruited participating students, peers, and staff from three high schools in [state masked] through special education case managers. Case managers identified students who met inclusion criteria at each school, recruited focus students, and sent consent forms directly to parents/guardians. After case managers collected all consent and assent forms, we randomly selected one general education class for each participant and recruited the special education teachers and paraprofessionals assigned to provide support in each class. Information about the students, peer partners, intervention facilitators, and classrooms are displayed in Table 1.

[Insert Table 1]

Students with Disabilities

To be included in this study, students had to (a) have a primary or secondary special

education label of autism; (b) attend a high school general education class, other than physical education; (c) have an individually assigned paraprofessional or special educator in that class; and (d) provide parental consent and individual assent. Students could also have a co-occurring intellectual disability, though this was not required. After participants consented and inclusion criteria were confirmed, we compared their initial baseline data to peer comparison data to ensure students needed social support in their general education classes (see Observational Methods for data collection procedures). One student was excluded because his social interactions consistently approximated his classmates.

Samuel. Samuel had both ASD and ID; he was eligible for the state's alternate assessment for students with significant cognitive impairment. He was enrolled in four general education classes (i.e., Carpentry, Agricultural Science, Art, P.E.) during which he received curriculum modifications (e.g., multiple formats for directions, directions in small steps, modified difficulty level of content, flexible time limits and breaks, modified worksheets, shorter tests, peer tutoring). Samuel communicated verbally using full, but short sentences. The only social goal in his IEP included communicating in an audible tone. Prior the intervention, he rarely engaged in class activities unless directed by the paraprofessional, and he required frequent prompts to continue working. His intervention was implemented in an inclusive Carpentry class.

Allen. Allen had ASD and ID; he was eligible for the state's alternate assessment. He was enrolled in three general education classes (i.e., Nutrition, Theatre, P.E.), where he received curriculum modifications (e.g., directions given in alternate format, modified difficulty level or abbreviated assignments, modified testing content, repeated directions and/or prompting during tests, use of manipulatives, peer tutoring, social skills instruction). Allen had no social goals in his IEP. Allen communicated verbally using full sentences. He infrequently maintained eye

contact and engaged in high rates of verbal (e.g., scripting, talking to himself) and physical (e.g., pacing on tiptoes, looking up at lights, flicking his fingers in front of his eyes) repetitive behavior. The intervention took place in his Nutrition class.

Nathan. Nathan was a student with ASD and specific learning disability. He was pursuing a regular diploma and had testing accommodations (e.g., directions given in multiple formats, oral testing, extended time). Nathan was enrolled in four general education classes (i.e., Biology, World History, Algebra, P.E.) with curriculum accommodations (e.g., preferential seating, typing assignments as needed, advanced copies of lecture notes). Nathan had no social goals in his IEP. He was enrolled in four general education classes. Nathan demonstrated average verbal ability and was able to engage in typical conversations with peers about age-appropriate topics, including sports, hobbies, and personal interests. During pre-baseline observations, Nathan often showed interest in classmates' conversations, attending and often laughing along with others, but he rarely joined in. His intervention was implemented in a Biology class.

Facilitators

Special education teachers and paraprofessionals already assigned to support each student in the general education class served as facilitators or the peer support arrangements (see Table 1 for demographics). As compensation for their time, they each received a $150 gift card.

Peer Partners

Facilitators invited up to three classmates to be "peer partners" for each student (see Table 1). They selected peer partners who did not have ASD or ID. Facilitators consulted with the focus student and general educator to identify peers with whom the focus student was acquainted or preferred, who had consistent attendance, who were considered to be positive role models, and/or who were willing to help others. Of the eight peers invited to participate, six agreed to do so; two never returned consent forms. No incentives were provided.

Observational Measures

Observers conducted direct observations 2-4 times per week throughout the entire class period. Measure definitions were drawn from Carter et al. (2016). Observers used a paper-pencil recording system and a vibrating digital interval timer set to 15-s intervals to collect observational data on dependent variables, treatment fidelity measures, and instructional format.

Dependent Measures

Observers used 15-s partial interval recording to code *social initiations* and *responses* (i.e., 15-s observe, 15-s record) separately for the focus student, peer partners, and other classmates. *Social initiations* were any verbal or nonverbal (e.g., gestures, signs) behavior directed to or from the focus student that were preceded by at least 5 s without interactive behavior with the same peer. *Responses* were verbal or nonverbal communicative behaviors directly following (i.e., within 5 s) and corresponding to a peer's initiations. As the primary aim of the study was to increase interactions with peers without disabilities, observers did not code social initiations or responses with students with ASD/ID or with adults. If a social initiation and/or response occurred during an interval, we coded a *social interaction* as occurring for that interval. During the baseline phase, we coded all interactions by peers as *other peers* because peer partners were not identified. Social outcomes are reported as percent of intervals.

Observers also coded the *quality* of social interactions occurring during each 15-s observation interval using a 3-point, Likert-type scale. This subjective measure is an average of scores for *content* (i.e., 3=*appropriate*, 2=*neutral,* 1=*inappropriate*) and *affect* (i.e., 3=*positive,* 2=*neutral,* 1=*negative*). Appropriateness of interaction content was based on similarity to the interactions of other students in the class and its suitability to the class context and the student's age. Measures of affect focused on behaviors indicating the focus students and peers enjoyed the interaction exchanges (e.g., smiles, attentive body language). Observers provided a summary

rating of the content and affect of all interactions occurring in each 15-s observe interval, unless no interactions took place.

Observers also collected observational data on *academic engagement* to ensure social interactions did not interfere with student's engagement in class activities. Academic engagement included looking at or using materials (e.g., textbook, worksheet, overheads) related to ongoing instructional activities; looking at the teacher; writing related to the assigned activity; following teacher directions; raising hand; or asking questions of the general educator, special educator, paraprofessional, or another student about instructional activities. We used momentary time sampling recorded every 30 s and reported academic engagement as percent of intervals.

Observational Measures of Treatment Fidelity

Peer academic support included behaviors designed to promote participation or completion of academic tasks or assignments (e.g., prompting, providing information or feedback, praise for correct responses). We measured peer academic support behavior using 15-s partial interval recording. *Proximity to peers* involved having a body orientation, distance (i.e., no more than 5 ft), and position by which the focus student could readily interact with at least one peer without disabilities. *Proximity to adult support* involved being physically located within 5 ft of the focus student. We used 30-s momentary time sampling to measure proximity. In addition, observers coded facilitative behaviors of the paraprofessional or special educator trained in the peer support arrangement, including *prompting, providing information, reinforcing,* and *checking in*, using 1-min partial interval recording.

Instructional Format

We used 30-s momentary time sampling to collect observational data on instructional format provided to the focus student. Options included *whole group* (i.e., eight or more students in a group, including the focus student), *small group* (i.e., three to seven students, including the

focus student), *partners* (i.e., focus student working with a peer), *independent work* (i.e., working independently without the assistance of peers or adults), and *one-to-one instruction* (i.e., individual instruction provided by paraprofessional or teacher). *No instruction* occurred when no clear direction or expectation was provided.

Peer Comparisons

To estimate typical levels of social interactions and academic engagement, we used the same observational measurement system with a randomly selected sample of peers without disabilities from each classroom. We conducted five peer comparison observations per classroom across all study phases. Observers coded one peer for the first half of the class period and another for the second half. We determined normative ranges for each classroom by calculating ±1 *SD* of the mean of all peer comparison observations (cf., Hughes et al., 1996).

Inter-observer Agreement

Three masters-level research assistants and the first author conducted all observations. Prior to conducting observations, all observers reached a minimum of 90% reliability across three videos and three live practice sessions. We collected inter-observer agreement (IOA) data in 48.4% of observations across participants and study phases, and calculated overall agreement, occurrence agreement, and nonoccurrence agreement. We calculated overall agreement by dividing the number of intervals with agreement (i.e., both observers coded the presence or absence of the behavior) by the total number of intervals and multiplying by 100%. We calculated occurrence agreement by the dividing number of intervals with occurrence agreements by the total number of intervals with occurrence agreements and occurrence disagreements. We calculated non-occurrence agreement by the dividing number of intervals with nonoccurrence agreements by the total number of intervals with nonoccurrence agreements and nonoccurrence disagreements. Agreement was above 90% for nearly all measures (see Supplemental Table).

Exceptions included academic engagement (non-occurrence agreement = 86.0%), proximity to other peers (non-occurrence agreement = 83.6%), proximity to peer partners (non-occurrence agreement = 73.8%), proximity to adult support (occurrence agreement = 79.5%), and peer academic support (occurrence agreement = 84.9%). Occurrence of proximity of adult support and non-occurrence of proximity to peer partners fell below 80% due to the low frequency of these variables across all three participants.

Experimental Design and Procedures

We used a multiple-probe-across-participants design to examine (a) the effectiveness of peer support arrangements and (b) adapted peer support arrangements to further increase social interactions. Probe sessions were balanced to ensure data were collected across all days of the week. We used visual analysis of level, trend, and variability of social interactions to make phase change decisions. After establishing a clear demonstration of the effect of the peer support arrangement for each participant, we conducted structural analyses using an alternating treatments design to examine the impact of contextual variables on social interactions within the context of the peer support arrangements. To ensure no changes in social interaction occurred as a result of the structural analysis procedure, we collected additional data prior to introducing adaptations to the peer support arrangement. We then examined the impact of adapted peer support arrangement across tiers. All adapted peer support arrangements incorporated an extra component based on the results of the structural analyses.

Baseline

Prior to introducing peer support arrangements, each focus student received direct support from his assigned adult in the general education classroom. Although the general educator was responsible for instructing all students in the class, the special educator assigned to each focus student implemented modifications and/or accommodations and supported

participation in class activities. Facilitators were recruited prior to baseline and knew the overall purpose of the study. During this phase, facilitators provided social and academic support as they had done previously; they received no additional guidance or training. All focus students sat in proximity to peers during baseline (see Table 2). None of the students received any formal assistance from peers but could recruit help incidentally.

[Insert Table 2]

Peer Support Arrangement

The peer support arrangement consisted of (a) facilitator training and development of a peer support plan, (b) peer partner orientation, and (c) ongoing adult facilitation with coaching, based on intervention procedures from Carter et al. (2016).

Facilitator Training. Each facilitator participated in an initial training lasting 1.5 to 2.25 hrs (M = 1.8 hrs). Didactic training consisted of oral instruction; guided discussion of needs specific to the student, peers, and class; and collaborative development of an individualized peer support plan. Each training closely followed printed manuals. Each facilitator received a binder including the manual, training materials, and supplemental materials (e.g., scripts for recruiting peers, sample peer support plans, examples of facilitation strategies). Training content addressed the goals of the intervention, strategies for recruiting peers, creating peer support plans, orienting and supporting peers, fading support, and the role of the intervention coach.

Peer Support Planning. Immediately after training, we collaborated with facilitators to develop a written peer support plan specific to the student and classroom in which they would implement the intervention. Each plan included the student's individualized goals, adult facilitation strategies (e.g., highlighting similarities among students, providing positive feedback for working together, redirecting interactions to peer partners), and support strategies for peer partners (e.g., ensuring the focus student has a role in group activities, encouraging interactions

with other classmates). Each plan listed strategies appropriate for each instructional format (e.g., whole group, small group, individual seatwork). Each facilitator shared the completed peer support plan with the general educator to solicit their input, ensure expectations aligned with those of the rest of the class, and encourage ongoing communication between them.

Peer Partner Orientation. Facilitators delivered the initial orientation for all peer partners outside of instructional time. It lasted 32 to 40 min (M = 37.3 min). All focus students declined to participate in these meetings. Facilitators reviewed topics according to a written outline, including (a) a rationale for peer support strategies; (b) background about the focus student (e.g., personal interests, academic support needs); (c) general goals of increasing involvement in class activities, increasing the number of peers with whom the focus student interacts, and decreasing reliance on adult support; (d) confidentiality and respectful language; (e) review and discussion of the peer support plan; and (f) guidance about when to seek assistance. We attended all orientation meetings; all facilitators covered 100% of topics.

Facilitating Peer Support Arrangements. After their orientation, the focus students and/or peer partners changed seats to be in proximity, if needed. Facilitation involved prompting students to greet each other and interact throughout the class, modeling interactions, identifying opportunities for social interactions, encouraging the students to work together on assignments when appropriate, and reinforcing peer partners and students with disabilities for working together and interacting. To encourage students to work on shared activities, facilitators collaborated with general educators to ensure academic adaptations and modifications aligned with the tasks assigned to peer partners. Facilitators monitored their own facilitation strategies (e.g., ongoing monitoring, ensuring shared activities, appropriate prompting and feedback, support for interactions with peers) at least twice weekly using self-monitoring checklists provided in the intervention manual.

Coaching. The first author served as coach throughout the intervention phases. Coaching occurred two times in the first week and continued once per week throughout the intervention. Initially, coaching included modeling of facilitative behavior and in-the-moment feedback and prompting for the facilitator. To control for the degree of coaching across participants, modeling and in-the-moment feedback occurred during the first three coaching sessions (i.e., two sessions the first week and one the second week). Feedback in all subsequent coaching sessions occurred at the beginning and end of class, unless facilitators solicited help during the class period.

Structural Analysis Procedures

Following introduction of peer support arrangements and an initial demonstration of effect, we conducted a structural analysis for each participant. We selected structural analysis conditions for participants based on contextual variables hypothesized to influence each participant's social interactions. During each structural analysis session, we recorded the frequency of social interactions to avoid underestimation and to enable differentiation across conditions in as few sessions as possible.

Developing Hypotheses. The facilitator, general educator, and coach collaborated to identify a list of contextual variables hypothesized to contribute to higher or lower levels of social interactions or that could account for some of the variability in the initial peer support data. First, we asked facilitators and general educators to describe circumstances when the peer support arrangement seemed to be going very well (i.e., students were interacting consistently) and times when students struggled to maintain interactions. From their anecdotal descriptions, we generated a list of contextual variables, including factors related to (a) instruction (e.g., familiarity with materials, task format); (b) peers (e.g., number of peer partners, proximity of other classmates); (c) adult support (e.g., proximity or availability of the facilitator, occurrence of teacher reprimands), and (d) physical environment (e.g., seating arrangements, classroom

noise level). The lists differed across each peer support arrangement. Second, we excluded variables not feasible to control without substantial interference in the daily routine of the class, such as instructional format (e.g., whole-group instruction vs. small-group activities) and physical arrangement of the classroom (e.g., location of desks and work spaces). Third, we selected the contextual variable anticipated to most likely affect the level of interaction in each peer support arrangement and identified two dimensions of the variable to be evaluated. For Samuel, we examined the effects of shared activities vs. solitary activities. The general educator and paraprofessional often assigned him alternative tasks when the rest of the class worked with materials (e.g., power tools) considered too difficult or dangerous for Samuel to use. Although frequently in proximity to his classmates, we hypothesized he would interact less during times when he was not working on the same or similarly aligned activities. For Allen, we examined the effects of working with one vs. two peers. We hypothesized working with one peer would result in higher levels of interactions, as he would become disengaged in the activity or conversation more quickly when working with or sitting in a small group. For Nathan, we examined the effects of peer attention vs. adult attention. We hypothesized pre-session peer attention would result in higher levels of interaction and adult attention would have an inhibitory effect on peer interactions. Although his facilitator and general educator frequently reminded him it was okay to chat quietly during class about the lecture or assignment, we observed fewer peer interactions when an adult checked in more frequently throughout the class period.

Structural Analyses. To experimentally evaluate each hypothesized contextual variable, we used an alternating treatments design for each structural analysis. Sessions occurred over a 3-day period for each participant. We started each day with a condition different from the previous day and alternated conditions during each class period, ensuring a minimum of 2 min between each session. We coordinated all condition changes with the general educator.

We provided brief training (10-15 min) on the structural analysis procedures, which focused on (a) instructing facilitators and peers to respond consistently to all social interactions across conditions (i.e., to keep the consequences of interactions constant) and (b) how peers would be cued to initiate interactions to control for the number of opportunities for students with ASD to respond. During structural analysis sessions, each facilitator responded to initiations directed to her in a brief, neutral way (i.e., neutral tone and facial expression, brief responses). Peer partners followed the same guidelines for responding in a neutral way to the focus student's initiations. In addition, peer partners followed cues to initiate interactions with the focus student. We provided them with a limited list of brief, open-ended initiation statements (e.g., "How's it going?") to use during each session. During structural analysis sessions, research team members cued peers to initiate an interaction with the focus student at 1-min intervals to ensure a minimum of five opportunities for the focus student to respond during each 5-min session.

For Samuel's shared activity condition, the teacher or facilitator assigned him the same task (e.g., building a model of a bridge) as the peers seated at his table. For the solitary activity condition, Samuel was directed to work on a task aligned with the course content, but different from the task assigned to peers at his table. For Allen's small-group condition, he sat with two peer partners and worked on the assigned activity. For the partner condition, the group split up to work on activities in different areas of the class, leaving Allen at the table with only one peer partner. To control for peer preference, we alternated peer partners across conditions. Before each of Nathan's structural analysis sessions, either a peer partner or adult (i.e., the facilitator or general education teacher) provided 60-90 s of attention (i.e., conversation about the class content, lecture, or assignment). Sessions started within 15 s after attention was discontinued.

We measured fidelity of structural analysis procedures across all sessions and planned for any session with less than 100% fidelity to be discontinued and/or dropped from the analysis. No

sessions met this criterion. Thus, the structural analysis results in Figure 1 reflect all sessions.

Structural Analysis Results and Adapted Peer Support Arrangements

In the second intervention phase, each peer support arrangement incorporated an extra component corresponding with structural analyses results. During this phase, all other aspects of the peer support arrangement remained the same.

Samuel's structural analysis indicated higher frequency of social interactions when students were assigned shared or aligned activities. To ensure aligned activities for Samuel and his peers, we provided coaching on ways to assign Samuel a role or job to allow him to participate in carpentry activities with his peers. Given frequent periods of no instruction, coaching also included strategies to encourage students to engage in leisure activities and side projects aligned with the content of the course. For example, Samuel had a project to construct a small-scale building made of popsicle sticks, following specific parameters. His facilitator encouraged him to get it out during downtime and to invite his peers to help him. This project was similar to a previous class assignment, which students appeared to enjoy.

Allen's structural analysis indicated higher frequency of interactions when working with one peer partner, rather than in a small group with two peers. Although the general educator frequently assigned students to work in small groups, each day the facilitator ensured one peer took the lead in the peer support arrangement and told Allen who he would be working with at the start of class. If peer partners had to switch in the middle of the class period, a peer partner or the facilitator told Allen with whom he would be working for the remainder of class.

Nathan's structural analysis results indicated higher levels of social interactions during sessions immediately following peer partner attention. Although Nathan and his peer partners would often engage in conversation during the peer support arrangement phase, this frequently occurred at the end of class as students packed up and waited for dismissal. Therefore, during the

adapted peer support phase, the facilitator encouraged his peer partner to converse with Nathan at the start of class and during breaks and transitions occurring throughout the class period.

Treatment Fidelity

Observers collected data on treatment fidelity across participants using checklists completed at the end of observation sessions during baseline (92.7%), peer support (87.5%), and adapted peer support (65.2%) phases. These checklists addressed adult facilitation (e.g., facilitating interactions, providing praise and feedback) and peer support behaviors (e.g., helping to participate in class activities, engaging in conversation, maintaining close proximity). Table 1 summarizes fidelity checklists across participants and phases. We calculated overall fidelity as an average of the core intervention components (i.e., bolded items in Table 1). Each observation also included data collection of variables related to intervention fidelity.

Social Validity

Facilitators, general educators, peer partners, and focus students completed social validity questionnaires after the study. Each included 20-23 items (see Tables 3 and 4), rated on a 5-point, Likert-type scale (1=*strongly disagree*, 5=*strongly agree*). Nathan completed his form independently, while items were read aloud for Samuel and Allen.

[Insert Table 3 and 4]

Results

Figure 2 displays the effects of peer support arrangements and adapted peer support arrangements on social interactions. Figure 3 displays the effects on academic engagement. Baseline data indicate stable or decreasing trends in social interactions across participants. Levels remained below normative rates for each classroom for the majority of baseline data points. Adult facilitation of social interaction remained low for all participations. Table 2 summarizes observational findings across participants. Also, we calculated effect sizes estimates

for social interactions across each phase (Tau-U; Parker et al., 2011), using a web-based calculator (Tarlow, 2016).

[Insert Figure 2 and 3]

Peer Support Arrangements

Samuel

Baseline levels of Samuel's social interactions averaged 1.0% of intervals, and peer interactions averaged 1.1% of intervals. His academic engagement averaged 7.8% of intervals, consistently below his classmates. Upon introduction of the peer support arrangement, an immediate change in level for both social interactions and academic engagement occurred. After a brief return to baseline levels of social interactions, we observed an increase in social interactions after one weekly coaching session focused on ensuring the facilitator was present from the start of class and implementing strategies to facilitate social interactions. During the peer support arrangement phase, Samuel engaged in social interactions during an average of 13.6% of intervals, and peer interactions increased to an average of 18.8% (13.6% for peer partners and 7.8% for other peers). Overall, the introduction of the peer support intervention positively impacted his social interactions (*Tau-U* = 0.64). Quality of interactions were rated as appropriate for content (*M* = 3.0) and positive for affect (*M* = 2.8). Despite an increase in the average percentage of no instruction from 24.0% during baseline to 31.5% during the first intervention phase, Samuel's academic engagement increased to an average of 47.1% of intervals.

Allen

During baseline, Allen's social interactions averaged 6.1% of intervals, with variability (*SD* = 8.2%). The introduction of peer support arrangements resulted in an immediate change in level and trend. Social interactions increased to an average of 18.1% of intervals. In addition,

peers directed interactions toward Allen during 30.2% of intervals on average (29.4% for peer partners and 2.2% for other peers), as compared to an average of 15.0% during baseline. The introduction of the peer support intervention improved the occurrence of social interactions (*Tau-U* = 0.56). Content of interactions was appropriate (*M* = 3.0), and ratings of affect were positive (*M* = 3.0). Allen's academic engagement increased from 53.2% to 60.4% of intervals. Variability on this measure was lower in the peer support phase (*SD* = 13.4%) relative to the baseline phase (*SD* = 21.7%).

Nathan

Levels of social interactions remained below 10% during baseline. Nathan's academic engagement was comparable to his classmates, averaging 87.6% during baseline. Introduction of peer support arrangements resulted in an immediate increase in level of social interactions, and positively impacted social interactions overall (*Tau-U* = 0.66). Improvement in the average level of social interactions (*M* = 24.9%) was accompanied by increased variability (*SD* = 18.0%). Peer interactions also increased to an average of 33.6% (33.2% for peer partners and 7.3% for other peers). The content of interactions was appropriate (*M* = 3.0), and affect was positive (*M* = 2.9). Nathan's academic engagement remained high throughout the intervention phase (*M* = 96.3%), exceeding normative levels.

Adapted Peer Support Arrangements

Samuel

The added effort to align activities with Samuel's peers resulted in overall improvement in his social interactions (*M* = 25.6%; *Tau-U* = 0.49). Peer social interactions increased to an average of 35.7%. Interaction quality remained high (*M* = 3.0 for content, *M* = 2.8 for affect). Prior to introducing this adaptation, the facilitator often directed the peer partner or another classmate to help Samuel complete a modified or alternative task, resulting in their removal from

the rest of the group. Enabling him to participate in aligned activities with the rest of the class permitted Samuel to interact with any or all of his classmates, including those not directly assigned to work with him. Therefore, while a large decrease in peer partner interactions was observed (from 13.6% to 0.8%), interactions with other classmates increased substantially (from 7.8% to 35.0%.). Furthermore, Samuel's proximity to peers increased (from 60.5% to 87.0%) and academic engagement improved (from 47.1% to 68.4%).

Allen

Identifying a peer partner to work with Allen at the start of class and each new activity resulted in an immediate increase in social interactions, followed by a decreasing trend, indicating limited impact of the adapted intervention overall (*Tau-U* = 0.0). However, examination of fidelity data showed the structural analysis-based adaptation (i.e., assigned peer partner) was implemented during less than 30% of the class period during Sessions 68, 72, and 73. Averages across days in which the adaptation was implemented with fidelity (i.e., 65-100% for all other data points) show increases in average social interactions for Allen (*M* = 36.3%) and his peer partners (*M* = 42.6%). Interactions were of high quality. In addition, increases in academic engagement (*M* = 69.4%) occurred despite variability of fidelity of the structural analysis adaptation. Average academic engagement across days with high fidelity of the structural analysis-based adaptation was higher (*M* = 78.4%) and less variable (*SD* = 7.3%).

Nathan

We observed a small decrease in Nathan's social interactions (from 24.9% to 19.2%). Variability of social interaction also decreased by more than half during the adapted peer support phase (*SD* = 7.4%). Overall, the positive effect of the adapted intervention appears to be limited (*Tau-U* = 0.11). These changes corresponded with decreases in peer partner interactions (*M* = 24.4%) and interactions with other peers (*M* = 2.2%). Interactions were rated as appropriate (*M* =

3.0) with positive affect (*M* = 3.0). Nathan's academic engagement (*M* = 92.6%) remained consistently above those of peer comparisons. Of note are changes in instructional format in the adapted peer support arrangements phase. The occurrence of independent work increased from 17.6% to 35.7% and partner and small-group activities decreased to 0%. Comparing levels of social interaction during the adapted peer support phase to days with similar instructional formats (i.e., whole group instruction or independent work for greater than 90% of the class period) during the first peer support phase indicates a modest increase in Nathan's social interactions from an average of 16.2% to 19.2%. This improvement occurred amidst comparable levels of peer partner interactions (*M* = 25.0% and 24.2% for intervention phase 1 and 2, respectively) and other peers (*M* = 2.4% and 2.2% for intervention phase 1 and 2, respectively).

Social Validity

Measures of social validity showed favorable views toward the intervention and the structural analysis. General educators and facilitators reported social and academic benefits for students with ASD and thought it was an appropriate way to address the educational needs of a student with disabilities (see Table 3). Samuel's general educator noted his concerns were specific to Samuel's Carpentry class, which was small and had few students who could do the work without extensive support. He felt the intervention would have been more successful and easier to implement if Samuel were enrolled in another of his Carpentry classes. Overall peers indicated feeling confident in their role, would recommend being a peer partner to other students, and would do it again in the future (see Table 4). All three focus students said they enjoyed working with their peer partners, would like to continue working with their peer partners, and considered their peer partners to be friends. Furthermore, social interactions and academic engagement of all three focus students more closely approximated those of their classmates when peer support arrangements were in place relative to baseline.

Discussion

We examined the effectiveness of peer support arrangements and the role of structural analysis as a means of further refining this intervention to meet students' needs in each educational context. Findings of this study demonstrated peer support arrangements were an effective model for improving social and academic outcomes among students with ASD within inclusive classrooms. Moreover, it showed that some further improvements can result from adaptations based on structural analysis data. Our findings extend the literature in several ways.

First, peer support arrangements were an effective means of improving social outcomes for high school students with ASD, two of whom also had ID. Among prior studies examining peer support arrangements in high schools, three had mixed samples that included some students with ASD and ID (Asmus et al., 2016; Carter et al., 2016; Huber et al., 2018) and only one study focused exclusively on students with ASD who did not have ID (i.e., Carter et al., 2017). Our findings build upon this small collection of studies to demonstrate the importance and value of adopting additional support strategies for adolescents with ASD within inclusive classrooms. Prior to intervention, interactions with peers were fairly limited, and participation in ongoing instructional activities was low and/or inconsistent. The introduction of peer support arrangements elevated peer interactions to levels that almost or often approximated those of their classmates without ASD or ID. As direct support shifted from paraprofessionals or special educators to peers, these social gains were accompanied by improvements in or maintenance of academic engagement within these courses.

Second, the structural analyses demonstrated the influence individual contextual variables could have on social interactions within general education classrooms. For all three students, differential patterns of interaction were evident depending on the types of activities, the peer groupings, or source of attention available to students. Incorporating structural analyses into the

natural classroom ensures the presence of all relevant and influential environmental factors. These findings highlight the way contextual factors specific to individual students and their classroom settings can influence outcomes within peer support arrangements. Although it is not surprising that different students responded to the peer support arrangement in somewhat different ways, the clearly differentiated social interaction patterns in each structural analysis supports the argument for effective formative assessment practices to guide the individualization of social interventions (Huber & Carter, 2016).

Third, by comparing the effects of peer support arrangements with and without structural analysis-based adaptations as part of the experimental design, we observed some positive effects resulting from the refinements made to peer support arrangements. Structural analysis-based adaptations to peer support arrangements resulted in improvements in social and academic outcomes for two students—improvements which maintained across those class periods in which the facilitator implemented adaptations with fidelity. For the third student, structural analysis-based adaptions seemed to improve social interactions when comparing only the days with mostly whole-group instruction and independent seatwork across intervention phases. These findings provide additional support for the use of structural analysis to further refine peer support arrangements (cf., Huber et al., 2018). To date, research on the use of formative assessment to individualize peer-mediated interventions is limited (Huber & Carter, 2016). The current study also illustrates the use of single-case design to test adaptations made based on formative data, by allowing the necessary comparison between the original and refined intervention.

Fourth, all stakeholders reported overall positive views toward the peer support arrangement and structural analysis, providing strong social validity for both. Facilitators and general educators acknowledged the social and academic value of peer support arrangements for students with ASD and expressed motivation to continue using this intervention with these and

other students with disabilities. Students expressed a desire to continue working together and recognized social benefits, including improved attitudes toward students with disabilities and friendships, not directly targeted by the intervention. Facilitators and general educators endorsed structural analysis as a useful and reasonable tool to inform adaptations to peer support arrangements.

Recommendations for Practice

These findings have important implications for educators responsible for supporting the inclusion of students with ASD in general education classrooms. Without purposeful planning and support, students with ASD—with and without ID—often fail to interact and participate with their classmates in the general education classrooms in which they are enrolled. Sitting or working in proximity to peers, as all three students in the current study did during baseline, is not enough. Peer support arrangements are a practical and effective way of involving peers in supporting participation, identifying opportunities for social interactions, and encouraging social connections. The minimal time commitment for training, ongoing facilitation, and documentation make peer support interventions a viable option for paraprofessionals and special educators, whose time is often limited. Moreover, the current study bolsters the limited research on formative assessment procedures for social interventions by offering strong support for the application of structural analysis in the context of a peer-mediated social intervention as a means of tailoring the intervention to meet the specific needs of students and their classes.

Limitations and Directions for Future Research

Several study limitations suggest directions for future research. First, researchers conducted all structural analyses, leaving the question of which school staff would implement or oversee this type of assessment apart from a research study. Given the simplicity of the alternating treatments design testing only two conditions, various school personnel (e.g., special

educator, behavior support staff, school psychologists) could readily be trained to carry out this assessment. As DBI and formative assessment fall under special educators' typical job duties, additional specialized personnel may not be necessary. In fact, because the general educator has more control over lesson plans and daily activities in the classroom, collaboration between special and general educators to conduct the assessment would provide added benefit. However, the practical issue of who should and can implement structural analyses in classrooms should be considered as part of future research.

Second, although structural analysis proved an effective means of comparing the influence of different contextual variables on social interactions, the confirmation of hypotheses generated through collaboration between facilitators, general educators, and the first author raises the question: Is it necessary to test those hypotheses experimentally or could interviews with facilitators and general educators be sufficient to inform intervention adaptations? In this study, each structural analysis included a comparison of two conditions, conducted over only 3 days—significantly less time than a typical approach to DBI used by most special educators. Using a more traditional DBI approach, hypothesis-based intervention adaptations would be alternated with a contrasting condition (i.e., A-B-A-B design), with data collection for each condition in place for at least 3 to 5 days, to gather enough data to draw similar conclusions as the structural analysis (Alberto & Troutman, 2013). However, additional research comparing the effects of unaltered interventions to interventions with adaptations based on hypotheses generated by interviews is needed to adequately address questions about whether time, effort, and resources might be saved by skipping the experimental step of the structural analysis.

Third, low fidelity of the structural analysis-based adaptions during three sessions complicated the evaluation of Allen's adapted peer support arrangement. Ensuring high fidelity of the structural analysis component across all sessions during the second intervention phase may

have resulted in a clearer demonstration of effect for Allen. Future research should include efforts to maintain fidelity of unchanged intervention components across both intervention phases and to ensure high fidelity of adapted elements during the adapted intervention phase to improve the likelihood effects (or non-effects) can be attributed to the adaptation.

Fourth, we had similar difficulty interpreting the effects of Nathan's adapted peer support arrangement due to the impact of different classroom instructional formats on levels of social interaction, raising questions about how to evaluate the effects of adaptions when uncontrollable contextual factors have a substantial impact on outcomes. One option is to conduct structural analysis sessions during only times of the most common instructional format. A second solution may involve conducting separate structural analyses during different instructional formats to test the effects of different contextual variables during each type of instruction (e.g., Stichter et al., 2009). Future research exploring these and other possible solutions are needed.

Fifth, continued efforts are needed to capture the full impact of these interventions. For example, more robust measures of academic attainment for students with disabilities are needed, such as access to the general curriculum or knowledge acquisition. Likewise, the extent to which these interventions produce reciprocal academic, social, and personal benefits for peers should be more rigorously examined (Travers & Carter, 2021).

Finally, while IOA was adequate for all primary outcomes, IOA for occurrence of proximity of adult support and non-occurrence of proximity to peer partners fell below 80% due to the low frequency of these variables across participants. Overall, facilitators remained in proximity to focus students at a low rate, and peer partners remained in proximity to the focus students at a high rate. Neither of these were primary variables, nor were they used to make phase change decisions. However, these outcomes should be interpreted with caution.

Conclusion

Without purposeful planning and intentional support, high school students with ASD may have few interactions with their classmates and limited engagement in learning activities, even within inclusive classrooms. Peer support arrangements can lead to more active class participation, create new opportunities for social interactions, and set the context for new peer relationships to develop. Furthermore, the limited time and resources required for training, facilitation, and documentation make this a viable and affordable option for school staff. The addition of structural analyses provides an avenue for educators to further tailor these interventions to enhance their effectiveness for particular students in specific classrooms. We encourage future researchers to replicate and extend these findings with additional students with ASD who vary in their characteristics and educational needs.

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Figure 1

Structural Analysis Results for Samuel, Allen, and Nathan

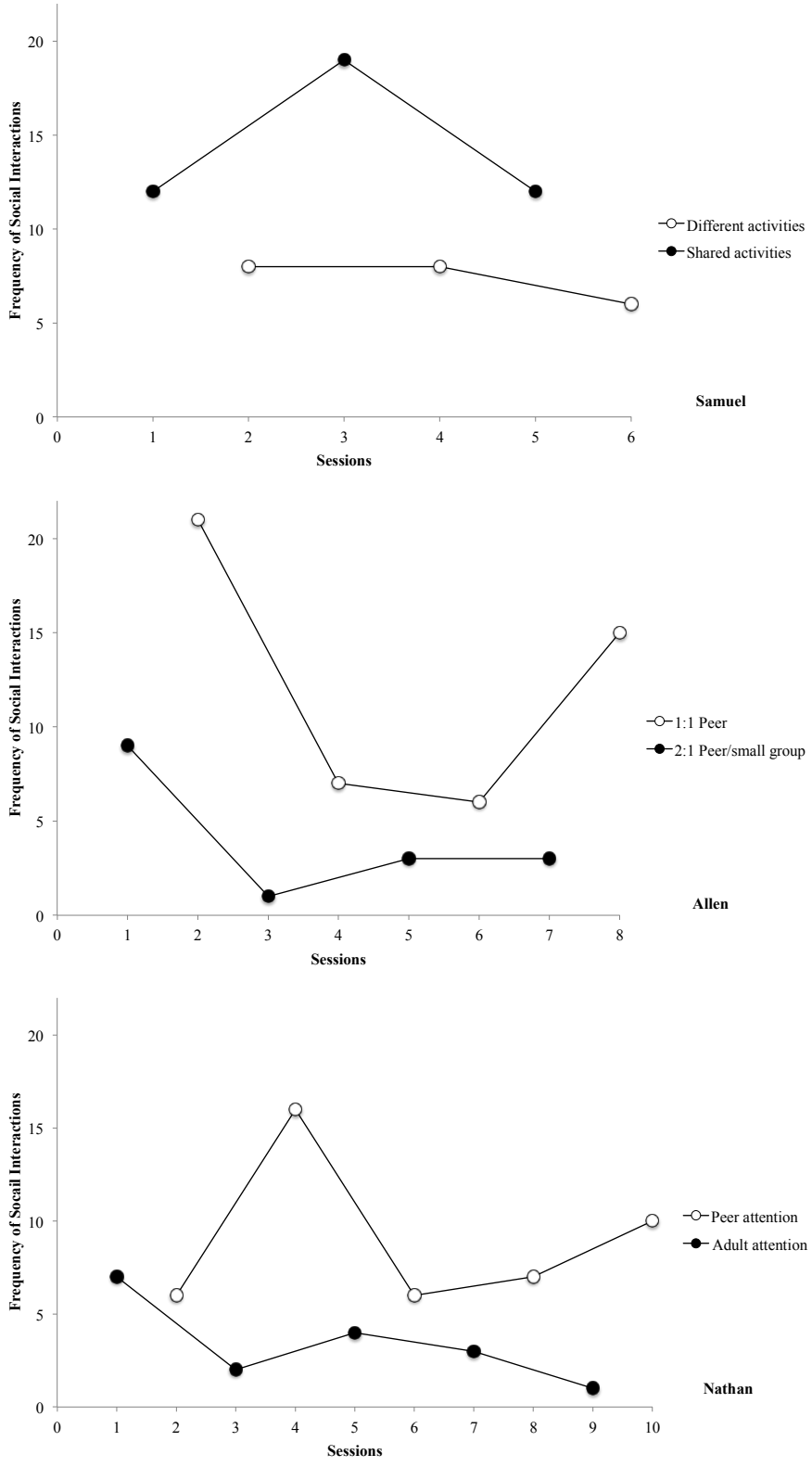
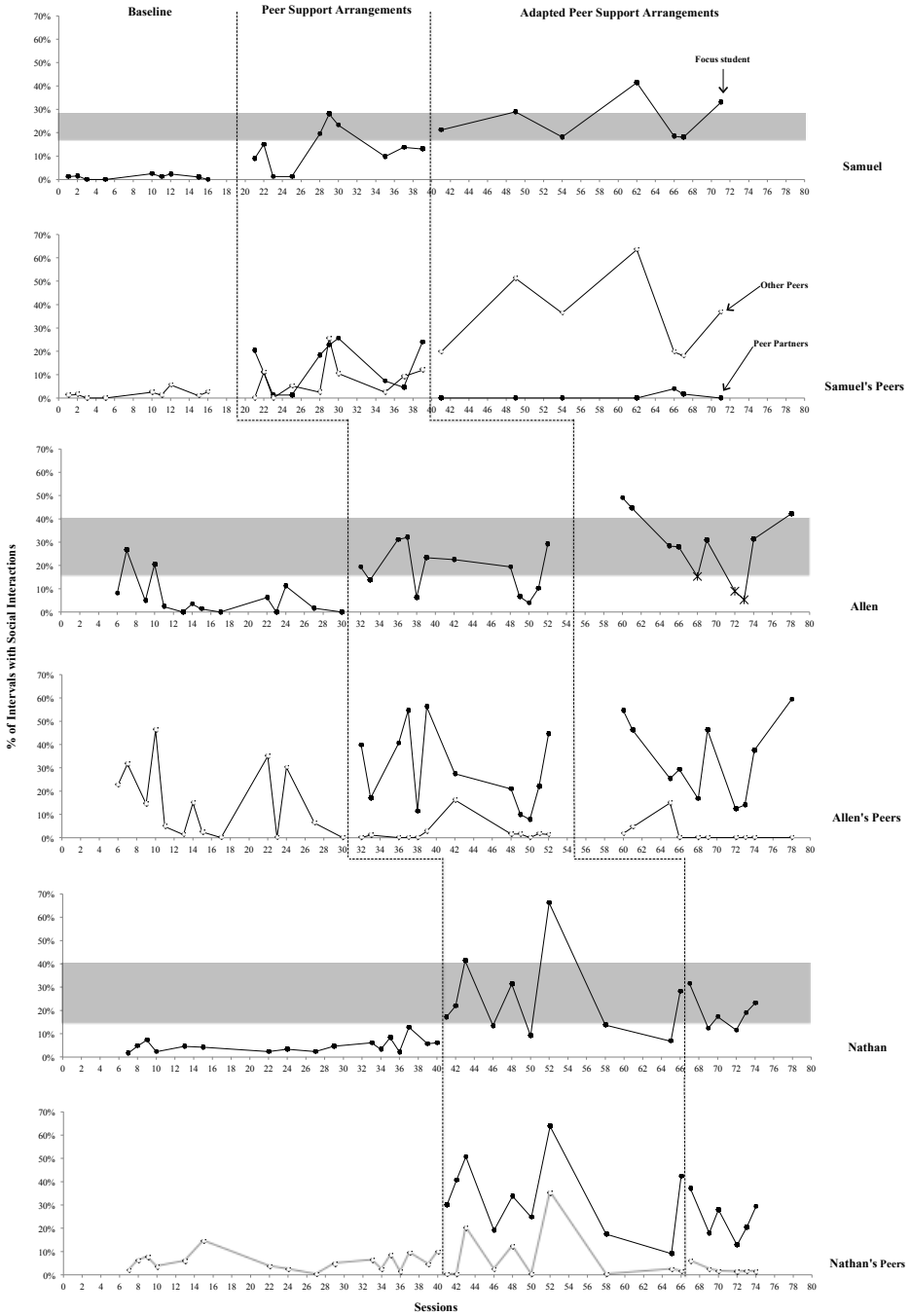


Figure 2

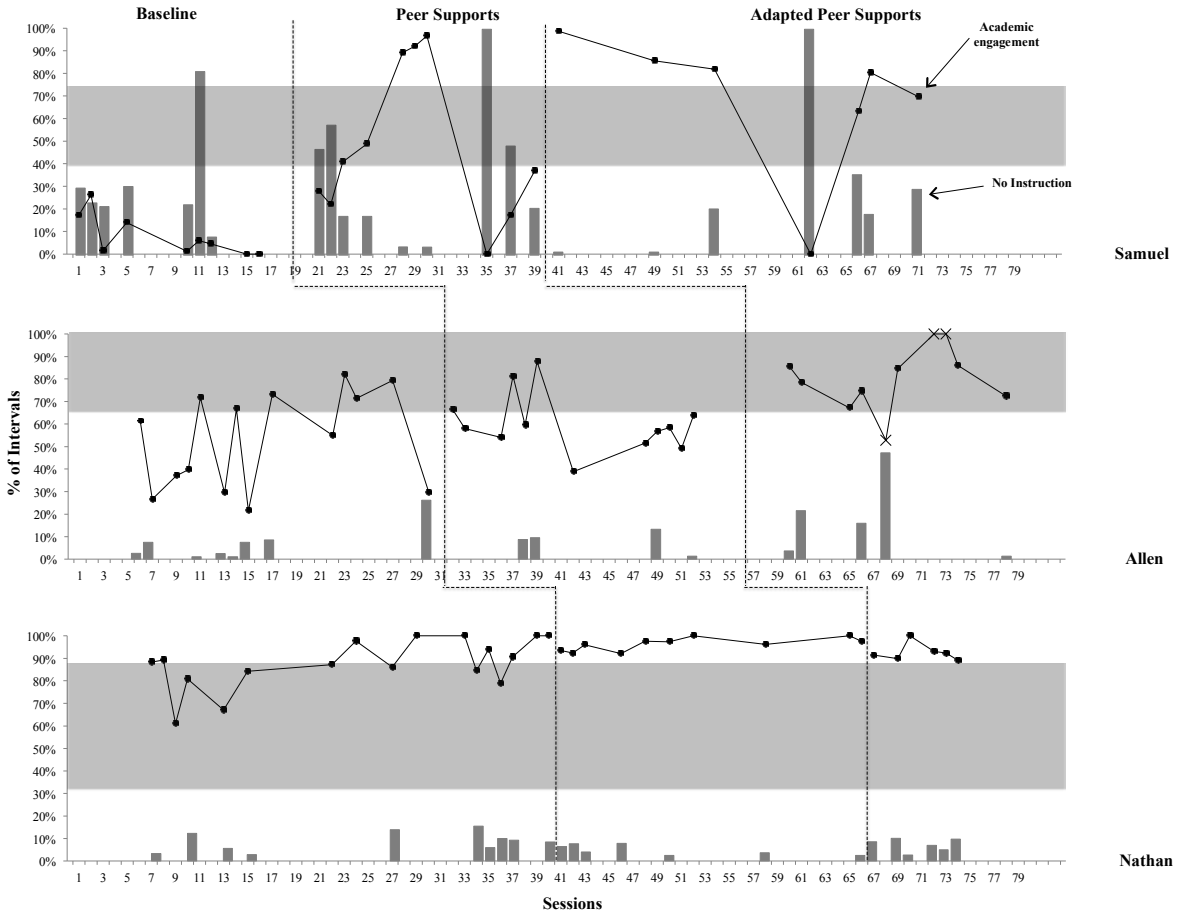
Social Interactions of Students with ASD and Their Peers



Note. Gray bars denote normative rates (i.e., 1 SD above and below the mean) of social interactions for each setting. Data points marked with an X in Allen's graph indicate low fidelity of the structural analysis-based adaptation.

Figure 3

Academic Engagement of Students with ASD



Note. Horizontal light gray bars denote normative rates (i.e., 1 SD above and below the mean) of academic engagement for each setting. Vertical dark gray bars denote the percent of intervals in which *no instruction* occurred. Data points marked with an X in Allen's graph indicate low fidelity of the structural analysis-based adaptation.

Table 1

Student, Peer Partner, Facilitator, and Classroom Information

Student demographics	Student testing	Peer partners	Intervention facilitator	General education class
Samuel Age 17, Male, White ASD and ID	IQ = 50 CARS-2 = 41.5 Social skills = 78 Problem behavior = 129	Age 15, Male, White No prior experience	Paraprofessional Female, White Completing bachelor's degree 4 years experience	Carpentry, 50 min length 8 students
Allen Age 17, Male, White ASD and ID	IQ = 46 CARS-2 = 39 Social skills = 96 Problem behavior = 115	Age 16, Female, White Age 17, Female, White Age 18, Female, White One was a "peer buddy"	Paraprofessional Female, White Completed master's degree 3 years experience	Nutrition, 47 min length 17 students
Nathan Age 14, Male, White ASD and SLD	IQ = 92 CARS-2 = 24.5 Social skills = 86 Problem behavior = 96	Age 14, Male, White Age 14, Male, White No prior experience	Special educator Female, White Completed master's degree 15 years experience	Biology, 47 min length 29 students

Note. CARS-2 = *Childhood Autism Rating Scale, Second Edition* (CARS-2; Schopler et al., 2010); ID = intellectual disability; Social skills = *Social Skills Improvement Scale*, Social Skills scale (Gresham & Elliot, 2008); Problem behavior = *Social Skills Improvement Scale*, Competing Problem Behavior scale (Gresham & Elliot, 2008); SLD = specific learning disability. Researchers completed each CARS-2 and special education case managers completed each SSIS. IQ scores were retrieved as part of school file reviews and should be interpreted with caution.

Table 2

Summary of Treatment Fidelity Across Participants and Study Phases

	Samuel			Allen			Nathan		
Abbreviated fidelity indicators	BL	PSA	Adapted PSA	BL	PSA	Adapted PSA	BL	PSA	Adapted PSA
Average number of peer partners present	-	0.9	1.0	-	2.5	2.8	-	1.7	1.0
Peers are in proximity to and interact with focus student	**62.5%**	**90.0%**	**80.0%**	**83.3%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Sat next to each other	37.5%	70.0%	75.0%	75.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Remained in proximity during out-of-seat activities	40.0%	71.4%	50.0%	42.9%	100.0%	N/A	33.3%	100.0%	N/A
Joined the same group during group activities	16.7%	87.5%	75.0%	62.5%	100.0%	100.0%	66.7%	100.0%	N/A
Peer partners interacted with the focus student	37.5%	90.0%	80.0%	58.3%	100.0%	100.0%	77.8%	100.0%	100.0%
Greeted the focus student	25.0%	60.0%	40.0%	8.3%	90.0%	100.0%	0.0%	12.5%	100.0%
Engaged in conversation	12.5%	90.0%	80.0%	58.3%	100.0%	100.0%	77.8%	100.0%	100.0%
Included the student in interactions with other peers	0.0%	60.0%	20.0%	8.3%	50.0%	50.0%	61.1%	50.0%	100.0%
Peers assisted focus student academically	**0.0%**	**80.0%**	**80.0%**	**58.3%**	**100.0%**	**100.0%**	**27.8%**	**100.0%**	**100.0%**
Helped the student participate in class activities	0.0%	70.0%	80.0%	58.3%	100.0%	100.0%	11.1%	100.0%	100.0%
Repeated or rephrased instructions for the student	0.0%	50.0%	60.0%	50.0%	100.0%	100.0%	5.6%	87.5%	100.0%
Appropriately prompted the student	0.0%	70.0%	80.0%	58.3%	100.0%	100.0%	0.0%	100.0%	100.0%
Provided appropriate feedback to the student	0.0%	40.0%	80.0%	50.0%	100.0%	100.0%	11.1%	100.0%	100.0%
Worked together on classroom activities	0.0%	80.0%	80.0%	50.0%	100.0%	100.0%	11.1%	100.0%	100.0%
Shared work materials	0.0%	80.0%	80.0%	50.0%	100.0%	66.7%	0.0%	100.0%	66.7%
Facilitator supported peers and student	**12.5%**	**100.0%**	**80.0%**	**8.3%**	**77.8%**	**66.7%**	**5.6%**	**75.0%**	**66.7%**
Facilitated interactions during class when appropriate	12.5%	100.0%	80.0%	8.3%	66.7%	50.0%	5.6%	75.0%	66.7%
Provided reminder/feedback to peer partners before, during, or after class	0.0%	30.0%	60.0%	0.0%	22.2%	50.0%	0.0%	37.5%	33.3%
Provided praise and feedback to students during or outside of class	0.0%	30.0%	60.0%	0.0%	33.3%	50.0%	0.0%	50.0%	66.7%
Structural analysis-based adaptations implemented as planned			100.0%			66.7%			100.0%

Note. BL= Baseline. PSA = Peer support arrangements.

Table 3

Facilitator and Teacher Perspectives on Acceptability of Interventions and Assessment

	Samuel		Allen		Nathan	
Questionnaire items	FA	GE	FA	GE	FA	GE
Overall, I enjoyed being in this project.	5	4	4	4	5	5
I feel I was effective in this role.	5	-	4	-	4	-
The student with a disability benefitted *socially* from having a peer support.	5	4	4	5	5	5
The student with a disability benefitted *academically* from having a peer support.	5	4	4	5	5	5
The peers without disabilities benefitted *socially* from being a peer support.	5	3	4	5	5	4
The peers without disabilities benefitted *academically* from being a peer support.	5	3	3	2	3	3
I am motivated to continue using this strategy.	5	3	4	5	5	5
The amount of time required to use this strategy was reasonable.	5	4	4	5	5	5
I would need ongoing consultation to keep implementing this strategy.*	1	3	2	2	2	2
Implementation of this strategy required considerable support from other school staff.	1	4	4	2	2	1
I would not be interested in implementing this strategy again.*	1	3	2	2	1	1
This strategy fits well within this classroom.	3	4	4	5	5	5
I understood the procedures of this strategy.	5	3	4	3	5	4
I would know what to do if I was asked to implement this strategy again.	5	2	4	4	5	3
The student with a disability has more friends as a result of this project.	5	4	4	4	4	4
This strategy was a good way to address the educational needs of the student with a disability.	5	4	4	5	5	5
This strategy negatively impacted other students in the class.*	1	3	2	1	1	2
I could use the strategies I learned through this project with other students.	5	2	4	5	5	4
I often use cooperative learning strategies with students in my classroom.	-	4	-	5	-	4
The peer support strategy would be feasible for me to implement if additional school staff were not in my classroom.	-	3	-	5	-	3
This strategy was a good way to address the educational needs of students without disabilities.	-	4	-	3	-	3
The amount of time required for record keeping with this strategy was reasonable.	5	-	4	-	4	-
Participation in the assessment required a considerable amount of time.*	1	-	4	-	2	-
The assessment process would be helpful for other students I work with.	5	3	4	5	5	4
The assessment results were useful to further understand the needs of the student.	5	4	4	3	4	3
The assessment procedure was disruptive to ongoing class activities.	-	1	-	2	-	2

Note. FA = Facilitator. GE = General educator. 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree. *Negatively worded items on which lower scores indicate endorsement. Blanks (-) indicate the respondent was not asked the specific items.

Table 4

Peer Partner Perspectives on Social Validity

	Samuel		Allen				Nathan	
Questionnaire items	FS	P1	FS	P1	P2	P3	FS	P1
At first, I was excited to have/become a peer support.	4	4	5	5	4	4	4	5
I felt confident serving in this role.	-	4	-	5	5	3	-	4
I had enough help from a teacher or teaching assistant (i.e., paraprofessional) to work with my partner well.	5	5	5	5	5	4	4	5
This was too much work for me.*	2	3	1	1	1	2	2	2
It was easy or easier to get my own work done while part of this project.	5	3	5	3	5	5	4	4
The initial orientation meeting with a teacher/paraprofessional was helpful.	-	3	-	5	5	5	-	5
Other students in the class should also do this.	5	4	4	5	3	4	4	4
I would like to have/be a peer support again in the future.	4	3	5	5	5	4	4	4
I understand why the teachers thought peer supports would be helpful for me/my partner with a disability.	4	4	3	5	5	5	4	5
Our school should have more peer supports for students with disabilities.	5	4	3	2	5	5	4	4
My partner with disabilities benefited *socially* from having a peer support (e.g., talks more with peers, has more friends).	-	4	-	5	4	5	-	4
My partner with disabilities benefited *academically* from having a peer support (e.g., participates more in class, learns new skills).	-	5	-	5	4	5	-	3
I benefitted *socially* from having or being a peer support.	5	5	5	3	5	4	4	4
I benefitted *academically* from having or being a peer support.	5	5	5	3	4	3	3	3
I consider my peer partner or partner with disabilities to be a friend.	5	5	5	5	4	4	4	4
I spend time with my peer partner outside of class.	1	-	2	-	-	-	4	-
I enjoy coming to this class.	5	-	5	-	-	-	5	-
I would recommend being/having a peer support to my other friends.	5	4	4	5	3	3	4	5
I enjoy coming to school.	5	-	4	-	-	-	4	-
My views about students with disabilities have changed for the better.	-	5	-	5	5	5	-	4
I also spend time with other students who have similar disabilities at my school.	-	5	-	4	3	3	-	5
Overall, I enjoyed being in this project.	4	5	5	5	5	4	4	5

Note. FS = Focus student. P1-P3 = Peer partners. 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree. *Negatively worded items on which lower scores indicate endorsement. Blanks (-) indicate the respondent was not asked the specific items.